

SUPPLEMENTARY MATERIALS

SUPPLEMENTARY METHODS

Data Processing

Joint

Joint flexion was calculated as the minimum angle of the joint. Joint extension was calculated as the maximum angle of the joint. Joint amplitude was calculated as the difference between the maximum and the minimum values of the joint angle. Joint average was calculated as the integral of the joint angle divided by the cycle duration. The joint stance was calculated as the integral of the joint angle divided by the stance duration. Joint swing was calculated as the integral of the joint angle divided by the swing duration. Joint velocity max was calculated as the maximum angular velocity of the joint. Joint velocity min was calculated as the minimum angular velocity of the joint. Joint velocity amplitude was calculated as the difference between the maximum and the minimum values of the joint velocity.

Elevation angle of segment

Elevation angle backward was calculated as the minimum elevation angle. Elevation angle forward was calculated as the maximum elevation angle. Elevation angle amplitude was calculated as the difference between the maximum and the minimum values of the elevation angle. Elevation angle average was calculated as the integral of the elevation angle divided by the cycle duration. Elevation angle stance was calculated as the integral of the elevation angle divided by the stance duration. Elevation angle swing was calculated as the integral of the elevation angle divided by the swing duration. Elevation angle velocity max was calculated as the maximum angular velocity of the elevation angle. Elevation angle velocity min was calculated as the minimum angular velocity of the elevation angle. Elevation angle velocity amplitude was calculated as the difference between the maximum and the minimum values of the elevation angle.

Endpoint

Endpoint trajectory was defined as the movement trajectory of the MTP joint in the vertical plane. Step length was defined as the displacement of the right foot from toe-off to toe-on in the heading direction within a swing phase. Step height was defined as the toe's largest vertical distance from the treadmill belt and was calculated as the MTP joint's amplitude of displacement variation in the vertical direction. Path length was defined as the total movement length of the endpoint within a gait cycle. Endpoint velocity swing, endpoint acceleration swing, endpoint orientation swing, max endpoint velocity, time maximal velocity, relative max backward endpoint, relative max forward endpoint, relative endpoint stance, and relative endpoint swing were calculated as described by Courtine et al. [1].

The ratio of PC1

The ratio of PC1 at 12 weeks post-lesion was expressed in percent with respect to the corresponding PC1 scores before surgery.

SUPPLEMENTARY TABLE

Table 1. Computed gait parameters. The various parameters computed from kinematic recordings.

Hip
Hip_joint_flexion
Hip_joint_extension
Hip_joint_amplitude
Hip_joint_average
Hip_joint_stance
Hip_joint_swing
Hip_velocity_max
Hip_velocity_min
Hip_velocity_amplitude

Knee
Knee_joint_flexion
Knee_joint_extension
Knee_joint_amplitude
Knee_joint_average
Knee_joint_stance
Knee_joint_swing
Knee_velocity_max
Knee_velocity_min
Knee_velocity_amplitude

Ankle
Ankle_joint_flexion
Ankle_joint_extension
Ankle_joint_amplitude
Ankle_joint_average
Ankle_joint_stance
Ankle_joint_swing
Ankle_velocity_max
Ankle_velocity_min
Ankle_velocity_amplitude

Pelvis
Pelvis_backward
Pelvis_forward
Pelvis_amplitude
Pelvis_average
Pelvis_stance
Pelvis_swing
Pelvis_velocity_max
Pelvis_velocity_min
Pelvis_velocity_amplitude

Thigh
Thigh_backward
Thigh_forward
Thigh_amplitude
Thigh_average
Thigh_stance
Thigh_swing
Thigh_velocity_max
Thigh_velocity_min
Thigh_velocity_amplitude

Shank
Shank_backward
Shank_forward
Shank_amplitude
Shank_average
Shank_stance
Shank_swing
Shank_velocity_max
Shank_velocity_min
Shank_velocity_amplitude

Foot
Foot_backward
Foot_forward
Foot_amplitude
Foot_average
Foot_stance
Foot_swing
Foot_velocity_max
Foot_velocity_min
Foot_velocity_amplitude

Endpoint
Step_length
Stride_length
Step_height
Path_length
Limb_endpoint_velocity_swing
Limb_endpoint_acceleration_swing
Limb_endpoint_orientation_swing
Max_limb_endpoint_velocity
Time_maximal_velocity
Relative_max_backward_limb_endpoint
Relative_max_forward_limb_endpoint
Relative_limb_endpoint_stance
Relative_limb_endpoint_swing

REFERENCES

1 Courtine, G., Gerasimenko, Y., Van d B.R., Yew, A., Musienko, P., Zhong, H., Song, B.B., Ao, Y., Ichiyama, R.M., Lavrov, I., Roy, R.R., Sofroniew, M.V., and Edgerton, V.R. 2009. Transformation of nonfunctional spinal circuits into functional states after the loss of brain input. *Nat. Neurosci.* 12:1333-1342.